NOTE XIV.

PHILORTHRAGORISCUS SERRATUS KR.

(DINEMATURA SERRATA KR.)

BY

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(Plate 7).

Foemina: Cephalothorax divisus. Segmentum secundum et tertium inter se coalitum, alatum, elytris nullis, quartum elytris duobus maximis, segmenti genitalis rotundati, postice profunde incisi, dimidiam partem tegentibus, instructum. Pedes abdominales trium parium anteriorum ramis biarticulatis, setis plumosis instructis, quarti paris minimi, ramis uniarticulatis, setis plumosis nullis. Cauda biarticulata, folio dorsali nullo. segmento genitali fere obtecta. Fila ovigera longissima.

Mas: differt a foemina magnitudine minore, figura elytrorum, praesertim pedibus abdominalibus tertii paris, hamulo magno in ramo interno instructis.

Hab. *Orthragoriscus nasus*, ad corporis superficiem.

Upon the skin of a specimen of *Orthragoriscus nasus*, caught in November of last year in the neighbourhood of Helder[1]), I found, besides numerous specimens of *Laemargus muricatus*, several female individuals of an other member of the family Caligidae, as far as I know off hitherto not mentioned as a parasite of this fish. They proved to belong to *Dinematura serrata*, described by Kröyer in his »Bidrag til kundskab om Snyltekrebsene" p. 176, pl. VIII, who however was unable to give any information about the origin of this Crustacean. As Kröyer's description is rather sufficient to recognize our parasite, I will especially dwell in the following remarks on those characters, which prove that it cannot be ranged in the genus *Dinematura*; moreover the description of a small specimen will be added, that probably represents the unknown male of our species.

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[1]) Notes Leyd. Mus. Vol. XVIII, p. 209, pl. 3.

As already stated by Kröyer, the animal shows some resemblance to *Laemargus muricatus*, but it is still a third smaller than the male of this species, and measures only 7$^1/_2$ à 8 mm. The cephalothorax is rather deeply emarginated posteriorly like in *Cecrops*, thus forming two rounded lateral processes and a truncated median part. On the latter, at its posterior margin, there is a row of conical tubercles, which seems to have been overlooked by Kröyer, while the lateral margin of the cephalothorax has a crenulated appearance by the presence of rather small tubercles. The second and third segments are coalescent and show a single oblong dorsal face, with a large wing-shaped process on each side. The fourth segment bears a deeply clefted dorsal shield, covering almost half the genital segment; its anterior margin is declivous, plain, and produced laterally in a small spine; its posterior border is rounded and crenulated. The genital segment is nearly round, with a deep fissure extending over the posterior third of its length; the anterior half of its margin is plain, the posterior one crenulated, and on the limit of both there is a small spine. On the ventral side of the genital segment of several individuals I observed a couple of brown, trumpet-shaped bodies (fig. 11) which undoubtedly represent the spermatophores; they have a narrow tube passing through their whole length and are attached with their broadest part on each side of the base of the abdomen.

The abdomen is not lengthened like in *Dinematura*, but rather short, the distal end of the caudal stylets only extending beyond the posterior extremity of the genital segment. It is two-jointed, and consists of a small elliptical basal joint and another one, that is of a reversed trapezoidal shape, with rounded anterior angles and a shallow notch in the middle of the posterior margin; it is nearly twice as broad as long. There are two short, obtuse conical caudal stylets, bearing six terminal setae. Foliate appendages, as there occur three in *Dinematura* and a single one in *Echthrogaleus* could not be found.

The egg-sacs are very long and measure about five times the length of the whole body.

The anterior antennae (fig. 1) are two-jointed and much resemble those of *Dinematura* and *Echthrogaleus*; however the apical joint in our species is somewhat longer and even exceeds in length the basal joint, in this regard more agreeing with *Lütkenia*, found by Claus on the gills of *Asterodermus coryphaenoides* 1). Besides some short terminal setae the apical joint also bears another seta in the middle of the ventral side, the basal joint is provided on its dorsal side with a kind of ridge, extending over about half its length, which bears an external row of long ciliose setae and an internal row of short spines.

The posterior antennae (fig. 2) much agree with those of *Echthrogaleus coleoptratus*; they consist of three joints: a cylindrical basal joint, a truncate conical second one, and the terminal claw. Kröyer erroneously speaks of three basal joints and the claw, but I presume that he mistook

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1) Zeitschr. f. wissensch. Zoologie, Bd. XIV, 1864, p. 369, pl. 34.

I think Gerstäcker (Bronn, Bd. V, Crustacea, p. 723) is not quite right, when he ranges *Lütkenia* among the Caligina, stating „nur das erste Paar der Spaltbeine einästig", for Claus himself points out the affinity of his new genus with *Echthrogaleus* and *Dinematura* and he says with regard to the first pair of swimming feet, that though it „eine zu der Gattung *Caligus* hinführende Umbildung erleidet, allerdings die beiden Aeste ihre zwei Glieder behalten." Also it appears somewhat dubious to me, that *Lütkenia* should be identical with *Cecropsina*, which has the genital segment deeply clefted and the swimming feet „setis terminalibus brevissimis instructi", whereas in *Lütkenia* yet the second and third pairs of feet are „setis plumosis instructi".

the brown-coloured distal part of the claw for a distinct joint. In the middle of the concave side the falcate claw bears a setose spine upon a conical tubercle; near the base of the same joint a similar smaller seta is placed more dorsally.

The palps (fig. 3) differ greatly in feature from those in *Dinematura* en *Echthrogaleus*; they possess a long basal joint, that is faintly S-like bent, and occupies about three fourth of its total length. This joint is nearly equally broad throughout its whole length, but it appears not to be quite cylindrical, for on its inner as well as on its lateral side a longitudinal depression is visible; on the middle of the dorsal side it bears two long and a short seta, situated next to each other. The distal part of the palp consists of three or four not distinctly separated joints and ends in a rather sharp terminal apex.

The anterior foot-jaws (fig. 4) possess two joints, nearly equal in length, but the distal of them about half as slender as the proximal one. The distal joint bears at its extremity two slightly curved, digitiform appendages, of about the same length, but the superior stouter than the inferior one; both are provided at their dorsal side with irregularly placed spines, whereas their ventral face is limited on each side by a regular row of them, arranged like a comb. In the axil between the two digitiform appendages a shorter conical process arises, beset with small spines over its whole surface, except a terminal cylindrical part. These foot-jaws differ greatly in shape from those of *Dinematura*, which bear at their extremity only a single curved finger-like appendage and springing near its base, nearly under a right angle, another process, that is more faintly curved and beset with small spines; in the axil between both processes there is a small tubercle, bearing a tuft of short setae on the top.

The posterior foot-jaws (fig. 5), also two-jointed but much larger, have a high compressed basal joint and a much more slender claw-shaped terminal one, that, bent backward, only reaches over two-thirds of the former, just till a conical spine that arises from the middle of the inner side of the basal joint, upon a broad hump-like base; at the opposite side, the joint bears a much smaller papilliform process, surrounded by a spoon-shaped cavity, formed by a prolongation of the upper margin of the foot-jaw. Probably this papilla is homologous with the palplike appendage of the *Dinematura*-foot-jaw. The terminal joint is connected with the basal one by a broad articulation; at its concave side, next to its base, it bears a small spiniform seta. This limb more resembles that of *Dysgamus*, than the more composite one of *Dinematura*. The first pair of swimming feet (fig. 6) is more slender than in *Dinematura* and shows more resemblance with that of *Echthrogaleus*; it is furnished with two two-jointed branches, the inner of which is short and does not reach beyond the extremity of the proximal joint of the outer branch. The terminal joint of both branches bears at the inner side three long plumose setae; moreover that of the outer branch is provided with four marginal spines, of which the two middle ones bear a secundary point near the apex. The distal joint of the inner branch is without spines, but it is externally fringed with hairs. A spine is visible at the exterior and the interior angle of the basal joint of the foot.

In the structure of the second pair of swimming feet (fig. 7) the difference from those of *Dinematura* and *Echthrogaleus* is already more pronounced; the first of them has both branches, the other one the outer branch three-jointed, whereas in our species both of them consist only of two joints.

Kröyer published a detailed description of these feet, so not much needs to be added. In contrast with the first pair of feet both branches here are nearly of the same length, and in both the proximal joint bears at the inner side a plumose seta; at its lateral side it is provided in the outer branch with a row of short, curved marginal spines, which is produced at the ventral side over the external distal angle. In the inner branch the lateral margin of this joint is fringed with hairs. The terminal joint of the inner branch bears on the distal half of its margin seven plumose setae, whereas the proximal half is provided with hairs. In the outer branch the terminal joint shows externally a row of eight small conical tubercles, followed by four spines and more internally by five plumose setae.

The third pair of swimming feet (fig. 8) is especially characterized by having the inner part of its basal joint produced in a large elliptical swimming plate, equalling in largeness the unpaired abdominal plate. The branches of these feet resemble generally those of the second pair, they are only more faintly developed. The terminal joint of the inner branch bears but four instead of seven plumose setae, that of the outer branch instead of five only four. The proximal joint of the outer branch is asymmetrical, by having its external half produced in a rounded plate, ending in a spine. In *Dinematura* this pair of feet has a quite different appearance and both branches are three-jointed.

The fourth pair of swimming feet (fig. 10) is rather small and totally covered by the preceding pair; it consists of an almost circle-round basal joint and two branches, each formed by a single joint of which the inner measures only a third of the length of the outer one. This latter bears at the outer side two, at the inner side three spines and is armed at the end with a long and a short spine; the shorter inner branch has only three small spines at the extremity. The basal joint is externally from the base of the outer branch provided with a seta. It is especially the rudimentary character of the last pair of feet, that makes me hesitating to refer this species to the genus *Dinematura*; in this genus the branches of the fourth pair of feet, though also single-jointed and without plumose setae, are produced in large plates, extending beyond the third pair of feet, and their basal joint is provided with winglike processes.

Also the feet in *Echthrogaleus* agree in their appearance with those of *Dinematura* though they are destitute of the wing-like processes of the basal joint.

Attached to one of the females I found a small specimen, which I presume to be a male, though differing in many regards, especially in the less slender shape, from the male of *Dinematura* and *Echthrogaleus*, as these have been described by P. J. van Beneden [1]) and Olsson [2]). The animal (fig 12) has a length of $4^1/_2$ mm. and agrees in general shape with the female, though it is somewhat more elongated; this is especially due to the abdomen being narrower and the caudal stylets being visible throughout their whole length. The genital segment is elliptical, with a plain margin, bearing only two spines on each side: a smaller anterior one, placed on a third of its length and a larger one situated more backwards. Also the dorsal shield is present, but it is much shorter, covering hardly a fifth of the genital segment; it is deeply notched, with a coarsely crenulated posterior margin.

The limbs of the male generally agree in their structure with those of the female, they are only more slender, f. i. the posterior antennae are not claw-shaped,. but faintly curved. Only the third pair of swimming feet (fig. 9) shows a highly remarkable modification in its feature, being partially transformed in a prehensile apparatus. The outer branch of the feet agrees in shape with that of the female and the mesial swimming plate of the basal joint, though less developed, is also present; however the inner branch, instead of being two-jointed, consists only of a single joint of an irregular rectangular shape. It bears still three plumose setae on its distal end, like in the female, but upon the inferior margin it is armed with a

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1) Bulletin de l'Acad. roy. de Belgique, 3e Sér. T. XXIII, 1892, p. 231, pl. II, figs. 11—13.

2) Prodromus faunae Copepod. parasit. Scandinaviae; Lunds Univ. Arsskrift, T. V, p. 18, pl. I, fig. 6. — I regret that I had no opportunity to see Thomson's paper on the Parasitic Copepoda of New-Zealand.

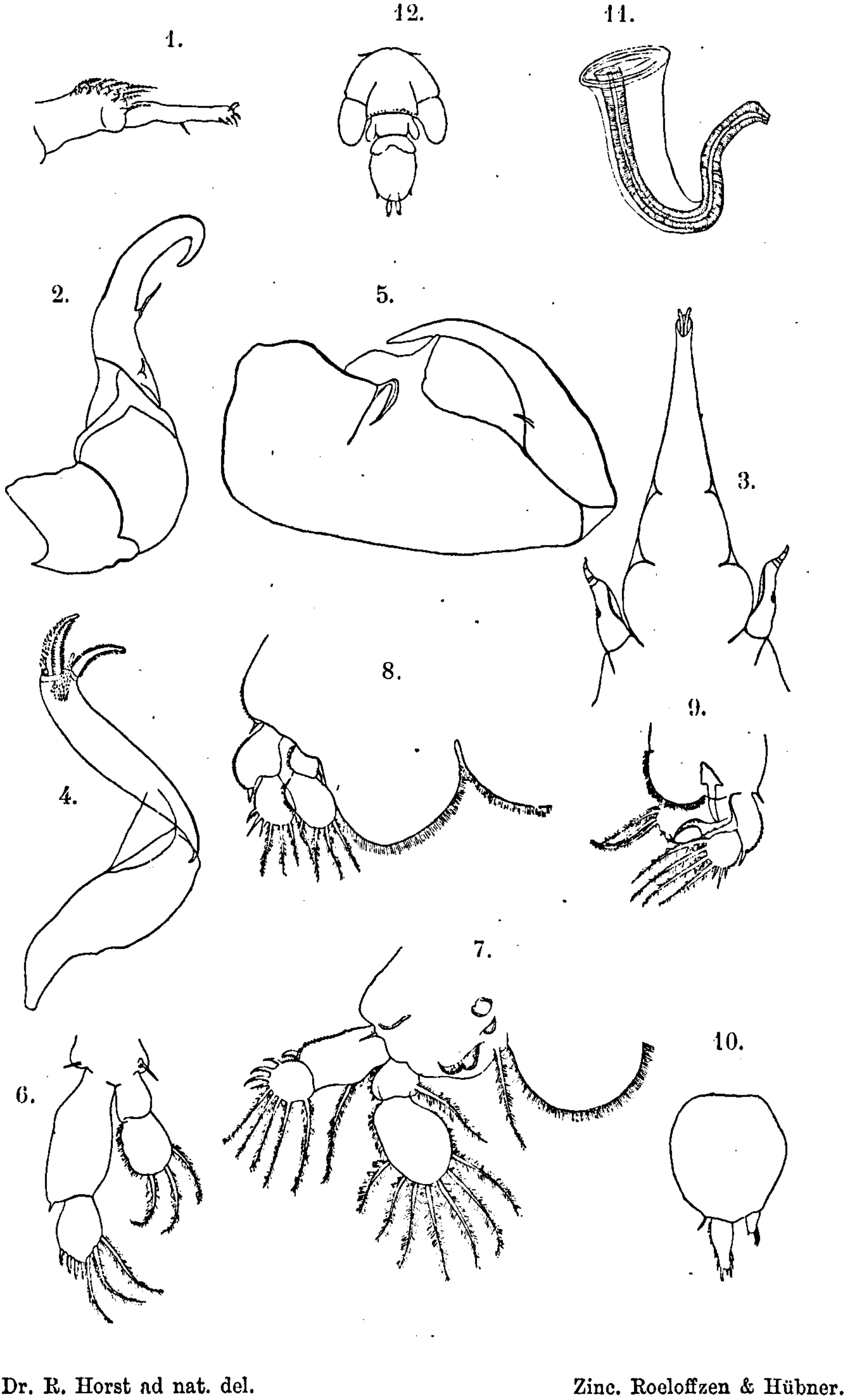
strong hook. In connection with this armature the chitinous covering of the joint is greatly developed, for the hook arises from a chitinous ridge that occupies the half of its ventral margin and is supported by another ridge, extending across the joint from beneath to above, where it is articulated with a chitinous thickening of the basal joint; also the muscles are much stronger than it is ordinarily the case. I do not know off an analogous modification of the third pair of feet in any other of the Caligina; though in some species a spine of the basal joint becomes stouter, hook-like curved, as in *Gloiopotes hygomianus*, *Caligus balistae* and *isonyx*, yet the ordinary shape of the feet is not modified.

Considering the different characters, discussed in the present paper, I believe, that our species is not referable to the genus *Dinematura* and therefore I propose the new generic name *Philorthragoriscus.*

Leyden Museum, June 1897.

EXPLANATION OF PLATE 7.

Fig. 1.	Anterior antenna of female	× 24 diam.
Fig. 2.	Posterior antenna of female	× 24 diam.
Fig. 3.	Rostrum of female with palps.	× 24 diam.
Fig. 4.	Anterior foot-jaw of female	× 24 diam.
Fig. 5.	Posterior foot-jaw of female	× 24 diam.
Fig. 6.	Right foot of first pair of female	× 24 diam.
Fig. 7.	Right foot of second pair of female.	× 14 diam.
Fig. 8.	Right foot of third pair of female	× 14 diam.
Fig. 9.	Left foot of third pair of male	× 24 diam.
Fig. 10.	Right foot of fourth pair of female.	× 24 diam.
Fig. 11.	Spermatophore	× 24 diam.
Fig. 12.	Male seen from above	× 4 diam.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Dr. R. Horst ad nat. del. Zinc. Roeloffzen & Hübner.

PHILORTHRAGORISCUS SERRATUS *Kr.*